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10/574,567	03/29/2007	Chikara Ohki	2006_0503A	9262

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EXAMINER	
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ART UNIT	PAPER NUMBER
1793	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/574,567	OHKI ET AL.	
	Examiner	Art Unit	
	Vanessa Velasquez	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 December 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *Jan. 9, 2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

Claims 1-4 are pending and presented for examination on the merits.

Status of Previous Objections

The previous objection to the abstract is withdrawn in view of the amendment submitted.

Status of Previous Rejections under 35 USC § 112

The previous rejections of claims 1, 4, and all claims dependent therefrom are withdrawn in view of the amendments to the claim.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on January 9, 2009 was filed after the mailing date of the non-final Office action on October 1, 2008. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Objection to the Specification

The amendment filed December 29, 2008 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no

amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: "Residual austenite" (original) has been changed to "retained austenite" (new matter) (pp. 1, 7, 10, 26, 27, 28). The specification does not provide support for this change.

Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Objections

Claim 1 is objected to because of the following informalities: The element iron is denoted as "FE," which is not its proper chemical symbol. Appropriate correction is required.

Claim Rejections - 35 USC § 112, Second Paragraph

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 1 and all claims dependent therefrom are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Specifically, the claim recites that Ti may be present in amount of "0.003% by weight or less." This range encompasses 0 wt.% and signifies that Ti is not necessarily required (i.e., it is optional). A later limitation of the same claim requires that Ti be present (i.e., non-zero). These two opposing options render the claim ambiguous because it is unclear what the invention is actually claiming with respect to the Ti content.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohki (US 2003/0123769 A1) in view of Okita et al. (US 5,672,014).

Regarding claim 1, Ohki teaches a steel composition, in percent by weight, comprising the following elements (para. [0024], [0025], [0055]):

Element	Claim 1	Ohki et al.
C	0.6 - 1.3	0.6 - 1.2
Si	0.3 - 3.0	0.15 - 1.1
Mn	0.2 - 1.5	0.3 - 1.5
P	0 - 0.03	0 - 0.1
S	0 - 0.03	0 - 0.1
Cr	0.3 - 5.0	0 - 2.0
Ni	0.1 - 3.0	silent
Al	0 - 0.050	0 - 0.1
Ti	0 - 0.003, required	silent
O	0 - 0.0015	0 - 0.1
N	0 - 0.015	0 - 0.1
Fe + impurities	balance	balance

The overlap between the ranges taught in the prior art and the claimed ranges is sufficient to establish a *prima facie* case of obviousness (MPEP § 2144.05 Section I).

Ohki's silence regarding titanium will be interpreted as the element being either absent or present only in negligible amounts as an impurity. If it is absent, its amount is zero percent. In the case that titanium was considered an impurity and since impurities do not exceed 0.1 wt.% (para. [0024]), titanium would have to be less than or equal to 0.1 wt.%, which would overlap the claimed range.

Still regarding claim 1, the microstructure of the steel is austenitic with grains having a JIS grain size number higher than 10 (para. [0031]). A roller bearing comprising an outer ring, inner ring, and rolling elements may be formed from the steel composition taught above (para. [0053]).

Still regarding claim 1, the heat treatment to which the steel of Ohki is subjected produces nitrides in the surface layer due to a final quenching step (para. [0011]), thereby producing a surface saturated with nitrogen.

Still regarding claim 1, Ohki does not teach the presence of nickel. Ohki is further unclear as to whether titanium is present in any amount.

U.S. Patent No. 5,672,014 issued to Okita et al. is drawn to a carbonitrided steel for the manufacture of roller bearings. The steel contains the same main alloying elements as Ohki with ranges that have substantial overlap (see abstract).

With regard to nickel, Okita et al. teach that adding nickel in amounts of up to 2.0 wt.% enhances the toughness of the steel (col. 15, lines 45-51). Therefore, it would have been obvious to one of ordinary skill in the art to have added nickel to the steel composition of Ohki in order to improve its hardness.

With regard to titanium, Okita et al. teach that titanium is considered an impurity in bearing steels (col. 10, lines 51-57). The steel of Ohki is a bearing steel. Thus, the steel of Ohki would be expected to contain impurities, such as titanium, that are common to bearing steels.

It is noted that although Okita et al. provide strong motivation to eliminate impurities from the steel because of its negative effect of shortening the life of the bearing (col. 10, lines 52-59), its complete or substantially complete removal is not economically practical given the large costs involved with the removal process (col. 10, lines 59-64). Okita et al. further teach that hardness and retained austenite are of much greater concern than suppressing impurities. Thus, because the efforts were not made

to completely or substantially completely remove impurities from the steel, one would expect that impurities such as titanium, sulfur, and oxygen remain therein.

Given this motivation to prevent high manufacturing costs, Ohki would also not be motivated to completely or substantially completely remove impurities contained therein. Therefore, one of ordinary skill in the art would expect the impurities common to bearing steels to also remain therein due to the burdensome costs of removing them.

Regarding claim 2, Ohki is silent as to the vanadium and molybdenum content. Okita et al. teach that molybdenum and vanadium are beneficial because they encourage the formation of surface carbides and nitrides, which enhance wear resistance and rolling fatigue life (col. 15, lines 25-45). Suitable amounts do not exceed 3.0 wt.% for molybdenum and 2.0 wt.% for vanadium.

Regarding claims 3 and 4, Ohki do not explicitly teach a nitrogen-enriched layer having a content of 0.1% to 0.7% or that said content is measured at a depth of 50 microns. However, the carbonitriding process taught by Ohki (FIG. 2) appears to be identical to that disclosed in the instant specification (see FIG. 2 of the instant application). It has been established that "[w]here the claimed and prior art products are identical or substantially identical in structure or composition, or are *produced by identical or substantially identical processes*, a *prima facie* case of either anticipation or obviousness has been established" (emphasis added, MPEP § 2112.01 Section I). In the instant case, the carbonitriding processes disclosed by Applicant appear to be substantially identical to that of Ohki. Therefore, the composition of the nitrogen-

enriched layer, including the depth at which it is measured, would be expected to be substantially identical to that of the claimed invention.

Okita et al. further support that a nitrogen concentration of 0.05-0.9 wt.% at the surface layer can be formed (col. 7, line 20), and that this layer improves surface hardness and wear resistance (col. 7, lines 21-31).

Response to Arguments

Applicant's arguments filed December 29, 2008 have been fully considered but they are not persuasive.

The Examiner would like to clarify the previous and current position regarding the rejection of claim 1 and the titanium limitation as it appears that the Applicant has completely misconstrued the Office action. The following sentence is taken from the Office action dated October 1, 2008: "Titanium is expected to either be absent ***or*** present only in negligible amounts" (emphasis added). This accounts for the possibility that titanium is absent (i.e., zero percent) in the alloy since Ohki did not definitively teach its presence. If titanium were zero percent in the alloy, the alloy of Ohki would have still met the claimed limitation because the original claimed range included 0 wt.%. The other possibility taken into account was that titanium is an impurity. In that case, titanium would have to be no greater than 0.1 wt.% since the impurities did not amount to greater than 0.1 wt.%, and this range would still satisfy the original claim.

With the currently amended claim, titanium is now a required component. To address this, Okita et al. is provided explaining that titanium is a common impurity in bearing steels. The full explanation may be found above in the rejection of claim 1.

Applicant argues that Ohki fails to understand the criticality of chromium despite the overlap between the ranges. In response, the fact that Applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). The presence of chromium in the invention of Ohki would still form the desired carbides the instant inventors describe due to overlapping composition and processing steps. When Ohki is considered with Okita et al., it is clear that one of the functions of chromium is to form carbides that improve fatigue life and wear resistance (Okita et al., col. 15, lines 10-23). Therefore, although Ohki may not have appreciated the function of chromium in the same manner as the instant inventors, the difference would have otherwise been obvious.

Conclusion

Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vanessa Velasquez whose telephone number is 571-270-3587. The examiner can normally be reached on Monday-Friday 9:00 AM-6:00 PM ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King, can be reached at 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/
Supervisory Patent Examiner, Art Unit 1793

/Vanessa Velasquez/
Examiner, Art Unit 1793